

R4D *Highlights*



DA-PCC names winners in 2021 R4D IHR of completed researches

BY DINE YVE DAGANOS

In the recently concluded 2021 Research for Development In- House Review of Completed Researches and Research Symposium, the DA-Philippine Carabao Center (DA-PCC) announced the winners for the three-day review from September 28 to 30 via video conference.

The research paper titled “Prevalence, Molecular Epidemiology and Antibiotic Resistance Profiles of Methicillin-Resistant *Staphylococcus aureus* (MRSA) from Milk and Nasal samples of Dairy

Buffaloes” authored by Claro N. Mingala, Alona T. Badua, and Paula Blanca V. Gaban received the “Best Completed Paper” award

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17th NBW celebration highlights Pinoy agribiotechnologies

BY MARAH ARQUERO

The National Biotechnology Week (NBW) celebration, held last November 22-26, highlights the crucial role of biotechnology innovations in healing the nation from the COVID-19 pandemic.

This essentially was the message of Department of Interior and Local Government (DILG) Secretary Eduardo Año who chaired the event.

“Our country needs to help each other in facing hunger, disease, economic collapse and environmental degradation. Biotechnology has become the foundation of our ongoing researches,

methodologies and other processes in creating new products for agriculture and medicine,” Secretary Año said.

With the theme “Kapit-bisig na Pagtutulungan, Bioteknolohiya Ating Paghusayan!”, physical and virtual exhibits during the celebration aim to showcase the efforts of the government, non-government sectors and private institutions working together to bring forth milestones and technologies achieved through Philippine biotechnology.

In addition, DILG Undersecretary Marlo Iringan said the Department’s goal is

to bring biotechnology to the local levels in the context of battling the COVID-19 pandemic.

On efforts to improve the public’s better understanding and appreciation of biotechnology, Department of Agriculture Secretary William Dar expressed his stance in fighting misinformation by proper information dissemination about biotechnology. He zeroed in on how biotechnology could be an instrument to halt malnutrition among Filipino children.

In his inspirational message, Department of Science and Technology (DOST) Secretary Fortunato Dela Peña underscored the support and innovations made by the department during the time of the pandemic such as promising results of virgin coconut oil and lagundi as treatment for COVID-19 as well as passing of the House Bill 2155 establishing the Virology Science and Technology Institute of the Philippines (VIP).

One of the featured Pinoy Agricultural Biotechnologies is the QuickCaRE Caprine Arthritis Encephalitis Virus (CAEV) Test Kit developed by the DA-Philippine Carabao Center.



This rapid, low-cost, pen-side DNA-based test with high detection rate can be performed in four easy steps without the use of specialized equipment.

(Continued on page 5)

DA-PCC joins 10th Asian Buffalo Congress

BY ROVELYN JACANG

Researchers from the Department of Agriculture-Philippine Carabao Center (DA-PCC) participated in the 10th Asian Buffalo Congress (ABC) with the theme “Buffalo Production for Food Security and Livelihood” held in Nepal and through a virtual platform in its member countries last October 25-29.

The ABC is a scientific congress organized

every three years and participated by Asian Buffalo Association member countries. Due to the pandemic, for the first time since it started in 1992, this year’s congress was joined virtually by over 300 participants from various countries.

Said ABC 2021 was organized by the Faculty of Animal Science, Veterinary Science and Fisheries, Agriculture and

Forestry University (AFU) in Rampur, Chitwan, Nepal.

Dr. Bhuminand Devkota, president of the Asian Buffalo Association and Chair of ABC 2021 organizing committee, welcomed the researchers and participants.

The congress’ objective is to foster research and development on buffaloes in the Asian region, which is home to 92% of the world’s buffalo population. Likewise, it aims to create an avenue for network and knowledge sharing among researchers, scientists, policy makers and other stakeholders.

The five-day event was participated in by researchers from Nepal, India, Pakistan, Sri Lanka, Philippines, Romania and Italy. A total of 67 research papers and 65 posters were categorized and presented under seven thematic areas, namely: Buffalo for Food Source, Policy and Socio-economics, Genomics and Biotechnology, Breeding and Production, Management and Nutrition, Health and Adoption, and Diversified Utility.

The DA-PCC presented 14 researches during the scientific conference.

DA-PCC conducts workshop on copyrights, and trademarks

BY CHARLENE CORPUZ

The DA-PCC, thru its Intellectual Property and Technology Business Management (IPTBM) office, conducted a “Technical Workshop on Copyright and Trademarks” for the agency’s researchers and employees last November 22.

This virtual learning activity aims to capacitate the participants on how to conduct a trademark and copyright search using various databases, file them online through the Intellectual Property Office of the Philippines (IPOPHL), and determine what works are eligible for copyright and trademark protection.

Dindo Dumali, IP Rights Specialist III of IPOPHL, served as the resource person of said activity. The two major topics that were discussed included:

Introduction to Copyrights and Introduction to Trademarks and Nice Classification.

The DA-PCC’s implementation of Intellectual Property (IP) management-related program aims to improve the translation of innovations derived from its Research for Development (R4D) programs into commercial products and public goods.

IPs such as patents and Utility Models (UMs) were filed at the IPOPHL through the establishment of the IP-TBM Office and the support of DOST-PCAARRD Phase II Project, Patent Mining in Dairy Buffalo and Cattle Thru IP-TBM in the Philippine Carabao Center.

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As of January 2021, the collection of cryopreserved semen and oocytes are from various species, which are 91.31% buffaloes, 8.41% cattle, 0.28% caprine, and 0.01% swine.

National Livestock Cryobank strengthens ex situ conservation of AnGR in PH

By MA. CECILIA IRANG AND LILIAN VILLAMOR

The ex situ or off-site conservation and management of animal genetic resources (AnGR) paves the way for sustainable genetic diversity of livestock species in the country through the National Livestock Cryobank (NLC) facility.

The construction of this facility was made possible through the technical assistance and generous support of DA-PCC's international partners, which include the Republic of South Korea through the Korea International Cooperation Agency (KOICA) and the United States of America through the Public Law (PL) 480 project, "Strengthening the Livestock Biotechnology Center".

The NLC, situated at the Livestock Innovations and Biotechnology Complex of the DA-Philippine Carabao Center (DA-PCC) in the Science City of Muñoz, Nueva Ecija, will aid in the advancement of research for development (R4D) works on ex-situ cryoconservation for animal genetic resources (AnGR) from diverse livestock species towards conservation, management, and utilization, leading to sustainable animal production systems.

These endeavors are seen to sustain the genetic diversity of livestock species such as buffalo, cattle, and goat, among others, in the country and to provide a

source of genetics to be used by farmers, livestock breeders, and other interested clients.

During the inauguration program, Secretary Dar deposited frozen buffalo semen in the cryotank, as part of a demonstration that the AnGR can be stored in an extremely cold temperature and can stay viable until future utilization. The cryobank repositories, which consist of six huge cryotanks and liquid nitrogen depot, are utilized as storage for frozen animal genetic materials.

The NLC is capable of long-term storage of frozen semen in storage tanks applied and maintained with liquid nitrogen. This is being done for future utilization in sustaining the supply of animal genetics.

The establishment of the DA PCC-Cryobank in 2012 has served as a catalyst for the inauguration of the NLC. The NLC aims to lead the national effort to increase the preservation and cryoconservation of AnGR from diverse

indigenous and introduced species and breeds within the species. These are animals that have economic importance and exhibit adaptable and resilient traits towards diseases and adverse effects of climate change.

As of January 2021, the collection of cryopreserved semen and oocytes are from various species, which are 91.31% buffaloes, 8.41% cattle, 0.28% caprine, and 0.01% swine.

In addition, DNA samples and cryopreserved whole blood cells from various species are preserved as genetic sources for molecular analysis in genetic diversity studies, species identification, and other research outputs.

The number of collected AnGR from species and breeds of animals is still meager to represent the country's genetic diversity. Thus, the declaration of DA-PCC's Cryobank facility as the National Livestock Cryobank towards conservation and management program has made headway to improve further the documentation and promotion of cryobanking activities and intensification of linkages and information relative to Philippine livestock breeds, including their cultural heritage and social importance.

DA-PCC conducts workshop ...

(From page 3)

Based on the previously conducted activity of IPTBM, "Technical Workshop on Prior Art Search, Claim Drafting and Invention Spotting for PCC Researchers" last September 6-10, trademarks and copyrights were identified as the types of IPs that also require focus, as they contribute to maximizing the value of products created out of research.

As of now, the DA-PCC has four patent applications, 20 UMs, of which, 13 are registered, and 15 trademarks, of which, nine are registered.

According to IPOPHL, copyright is acquired in such a way that works are protected by the moment of their creation, irrespective of the mode or form of expression, as well as their content, quality, and purpose.

Copyright protects the value of a researcher's work. Moreover, it gives

the creators rights on how their works are used. Trademark, on the other hand, is a name, symbol, or logo that is placed on the product. This refers to any visible sign distinguishing the goods or services of an enterprise (Sec. 121.1 RA 8293). The trademark owner has an exclusive right to use, sell, license, and profit from this type of IP.

For DA-PCC researchers and employees, understanding the nature of various IP rights, what they protect, how the rights can be gained and how efficiently they can be commercialized are some important takeaways from the said technical workshop.

Another technical seminar by IP-TBM on the fairness opinion report and fairness opinion board for technology transfer was conducted last December 14, 2021.

The NLC is capable of long-term storage of frozen semen in storage tanks applied and maintained with liquid nitrogen. This is being done for future utilization in sustaining the supply of animal genetics.



Unlocking the maternal lineages of Philippine Swamp Buffaloes

BY LILIAN VILLAMOR

Determining the maternal lineage of swamp buffaloes directly impacts on genetic improvement including plans and strategies for breeding, and conservation management.

Characterization and classification of swamp buffaloes, however, could be a lot complicated. Merely relying on a swamp buffalo's physical traits such as skin color, the shape of horns, and body type would be impractical and inaccurate given a huge population size.

Another way to properly classify an

animal's ancestry is through genetic analysis based on their deoxyribonucleic acid (DNA) traits, which are unique to each living organism but will require different biotechnological processes and trained personnel to produce scientific results.

It has been a long-standing question whether the maternal lineage of Philippine swamp buffaloes is just one that is represented by maternal lineage A. There are limited reports on the presence of maternal lineage B wherein China is one of the few countries in the world where swamp buffaloes thrived

and existed over time. Other Asian countries like Taiwan, Vietnam, and Laos got minor reports of maternal lineage B in their countries.

The DA-PCC's study on detecting the maternal lineages of Philippine swamp buffaloes was funded through the project DABIOTECHR1506. Its primary objective is to resolve the maternal lineages of Philippine swamp buffaloes.

Different concepts and techniques involving physical characterization and imploring molecular biotechnology tools and processes in analyzing the DNA characteristics of the swamp buffalo's population were performed. This involved collecting blood from the animals where DNA was extracted from, making more copies of DNA using the Polymerase Chain Reaction (PCR) Method, sequencing, and statistical and bioinformatics analysis.

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Hydroponic corn fodder: Effective alternative for feed concentrates in calves' diet

BY CHAMANEI ELIAS, CHARITY CASTILLO, REYNALDO AMINO, VICTORINO MAYO JR., CYRIL BALTAZAR, AND ARNEL DEL BARRIO

For buffalo raisers, calves need to be protected, managed, and fed properly to grow economically at an optimum rate. However, calf morbidity and mortality still remain a challenge for small-scale farmers due to insufficient milk feeding, calf injuries, and diseases.

In general, the low productivity of animals is attributed to poor nutrition resulting in poor birth weight of calf and sometimes abortion. This may be because farmers still practice the traditional way of feeding. Farmers spend more time feeding their animals by tethering in distant areas or by cutting forages far from their homes, which causes many farmers to reduce the animal holdings they keep or find new feed resources to maintain the health and nutritional requirements of their animals.

This can be mitigated through adopting hydroponic corn fodder as a supplement feed concentrate for calves' diet, as it provides benefits in terms of growth and economic viability.

In a recent study conducted by the DA-PCC Production System and Nutrition Section (PSNS), they cited that hydroponic fodder production can be a viable alternative solution to the limited land area for forage production for ruminant raisers, as it requires less land to produce year-round good quality forages and there will be no need of long-term feed storage, no feed nutrient losses, low labor cost, and low cost of production (AgriFarming, 2014).

Hydroponics is the growing of plant without soil. The plant basically depends on a water-based nutrient-rich solution. This system fosters rapid growth, stronger yields, and superior quality. According to Woodard (2019), when a plant is grown in the soil, its roots are perpetually searching for the necessary nutrition to support the plant. If a

plant's root system is exposed directly to water and nutrition, the plant does not have to exert any energy in sustaining itself. The energy that the roots would have expended acquiring food and water can be redirected into the plant's maturation. As a result, leaf growth flourishes, as does the blooming flowers and eventually, fruit.

Researchers Charity Castillo, Reynaldo Amido, Victorino Mayo Jr., Cyril Baltazar and Arnel Del Barrio evaluated the effect of hydroponic corn fodder on the growth performance of 12 Bulgarian Murah buffalo calves. They used two treatments with 6 replications. Treatment 1 (T1) comprised of Napier grass and starter feed concentrates while Treatment 2 (T2) comprised of Napier, starter feed concentrate and hydroponic corn fodder. The hydroponic corn fodder in T2 was used as partial replacement of starter feed concentrate by 50%.

Results of the study show that buffalo calves fed with hydroponic corn fodder in diet had heavier weights and gained higher ADG (average daily gain). The initial weights of the buffalo calves were 88.17 kg for T1 and 86.17 kg for T2. The average body weights at the end of the feeding trial were 135kg and 144.50kg with total body weight gains of 47.42 kg and 58.33 kg for T1 and T2, respectively.

Since the total body weight gain was higher in T2 than T1, the cost per kg gain in T2 was lower than T1. This means that hydroponics corn fodder can effectively substitute up to 50 percent of the concentrate feed without compromising the growth performance of the calves. The study then concluded that the difference was equally economically justifiable, as it requires a small area for the production and is suitable for regions where forage production is limited.

For nutrient digestibility, results show a higher Dry Matter intake of calves'

diet added with hydroponic corn sprout but without any significant changes in Crude Protein intake.

The findings are consistent with the study by Naik (2014), which concluded that feeding of hydroponic maize fodder to lactating cows increased the digestibility of nutrients and milk production leading to an increase in net profit. A typical cost of production cost includes seed, water, and electricity and while sprouts cannot replace 100% of an animal's diet, they have been scientifically proven to increase the digestibility of other feeds.

The study further recommends the installation of greenhouse hydroponic technology to produce high-quality corn sprouts. Other species of grains and pulses like sorghum, mungbean, and the likes must also be evaluated for potential use as fodder in supplementing the nutritional requirement of not only calves but also growing and lactating ruminants.

The study also found out that hydroponic corn fodder is highly palatable and nutritious to livestock particularly for newly weaned calves, as it is tender and can be eaten as a whole including the roots, ungerminated seeds, and grass.





Packaging and geographic availability, areas for improvement in Bohol Dairy products

BY ALDRIN GERONIMO, GUILLERMA ABAY-ABAY, MA. TERESA MANITO, RAQUEL ORJALISA, AND CARO SALCES

A consumer preference study conducted by DA-PCC at Ubay Stock Farm (USF) found out that packaging and geographic availability were among the top areas for improvement of dairy products in Bohol.

The four-year study titled “Consumers’ Preferences for dairy buffalo milk and milk products in Bohol Dairy Outlets: an analysis on market” gathered the response of over 771 residents of Bohol, to gauge consumer insights on dairy

products that will serve as basis for product modification.

The study identified five areas for improvement which include (1) design, presentability and durability of packages, (2) wider availability in different locations, (3) promotion and advertisement, (4) consistency of taste, and (5) affordability.

Aside from areas for improvement, the research also identified the attributes of products on which consumers

put the highest premium. Taste and nutritional value were prioritized by the respondents for all dairy or dairy-flavored products such as bread and pastries, butter, cheese, milk, and ice cream. This implies that consumers are more willing to compromise on other characteristics such as appearance, consistency, and aroma with taste and nutritional value.

Results of the study also showed that flavored milk, ice cream, bread and pastry, and pasteurized milk are the most preferred products by consumers.

Researchers, Guillerma Abay-Abay, Ma. Teresa Manito, Raquel Orjalisa and Caro Salces, suggest that the Bohol Dairy Product Company consider enhancing the product design, presentability, and durability of packages; distribution of products in different locations; and promotion and advertisement of products.

Taste and nutritional value were prioritized by the respondents for all dairy or dairy-flavored products such as bread and pastries, butter, cheese, milk, and ice cream. This implies that consumers are more willing to compromise on other characteristics such as appearance, consistency, and aroma with taste and nutritional value.

Unlocking the maternal...(From page 6)

Significant findings were derived from a sample of 107 Philippine swamp buffalo in 23 different populations of Luzon, Visayas, and Mindanao islands. The study revealed the presence of both maternal lineages A and B in the sample population using the mitochondrial DNA D-loop region variation.

A distant relationship was also observed on the genetic relationship per inter island basis in animals living in Luzon and Mindanao. The close relationship observed between Visayas and Mindanao swamp buffaloes can be attributed to the vast distance between these major island groups. This can also be explained by the historical event of the early migration of Visayan farmers and their carabaos to cultivate the agricultural land of Bukidnon province in Mindanao.

Furthermore, the results of the study tried to shed some light on the disputed claim that there is no maternal lineage B present in the Philippines. It refuted previous studies claiming that only maternal lineage A is currently present in the country.

These findings set new priorities in R&D pertaining to both on-site (in situ) and off-site (ex situ) conservation management processes like actual conservation of animals in their natural habitat and storing animal genetic traces such as semen and blood samples, respectively.

Efforts along this line could pave the way for future planning and strategies that will enhance the implementation of native animal genetic resource conservation.

Acknowledgment:

The research outputs emanated from the DABIOTECHR1506 by LPVillamor, EBFlores, ASSarabia, AMParaguas, AJDSEscuadro, and PC Cailipan, which was funded by DA-Biotech and DA-BAR. In addition, an extension work as part of the dissertation of LPVillamor was conducted under the mentorship of Dr. Koh Nomura, Dr. Yukimizu Takahashi, and Takahashi Amano in Tokyo University of Agriculture, Atsugi Campus, Japan through the Ph.D. by research Tokyo NODAI-SEARCA scholarship.



Researchers record the body measurements of animals as part of gathering baseline information on morphological characterization of swamp buffalo in the Philippines.

DA-PCC names winners..(From page 1)

with 93.75% average score. Under the criteria for the said award, the Title comprises of 10%, Introduction 10%, Materials and Methods 25%, Results and Discussion 40%, and finally the Summary and Conclusion for 15%.

The DA-PCC at Ubay Stock Farm (DA-PCC at USF) was also given recognition for having the “Most Number of Papers Presented,” while Dr. Thelma A. Saludes from DA-PCC at University of the Philippines Los Baños (UPLB) received the award for “Best Oral Presenter.”

Apart from certificates, the

winners also received cash prizes.

The panel of evaluators were Dr. Virginia Venturina, Dean of the College of Veterinary Science and Medicine in Central Luzon State University (CLSU); Dr. Joice San Andres, Department Chair of Animal Science, College of Agriculture, CLSU; Prof. Jessica Rustia, Associate Professor V of the Department of Food and Science Technology, College of Home Science and Industry, CLSU; and finally Dr. Consuelo Amor Estrella, Professor, Institute of Animal Science, College of Agriculture and Food Science UPLB.

Roster of DA-PCC's SCIENTISTS

By MA. CECILIA IRANG

Five DA-PCC researchers took their oaths either as newly conferred or upgraded scientists, under the Scientific Career System (SCS) by the Department of Science and Technology (DOST) and the Civil Service Commission (CSC) in a virtual ceremony held on September 22.

National Genetic Improvement Program (GIP) Coordinator Dr. Ester Flores and Senior Science Research Specialist Dr. Lerma Ocampo have been conferred the rank of Scientist I under the Agricultural Sciences Division effective December 3, 2020 and May 21, 2021, respectively, joining the agency's growing pool of career scientists.

DA-PCC's scientist couple Dr. Edwin and Eufrocina Atabay were conferred Scientist II rank on May 21 while Deputy Executive Director for Production and Research Dr. Claro Mingala was upgraded to career Scientist IV effective January 26.

Their significant contributions and noteworthy accomplishments in the agricultural science made them qualified and eligible to the career scientist rank, granted by the Scientific Career Council

(SCC), which is the governing body of the SCS.

The SCS is "a system of recruitment, career progression, recognition and reward of scientists in the government service as a means of developing a pool of highly qualified and productive scientific personnel". Its program is being administered by the National Academy of Science and Technology (NAST).

Meanwhile, Senior Science Research Specialist Dr. Marvin Villanueva was also recognized as the 2021 Outstanding Young Scientist of NAST in the field of Veterinary Medicine. The virtual awarding ceremony was held last July 14 during the 43rd Annual Scientific Meeting.

Significant contributions, accomplishments

Dr. Flores, DA-PCC's supervising science research specialist, has significantly contributed to the establishment and implementation of separate structured breeding program for riverine and swamp buffaloes; development of a suitable genetic evaluation model for estimation of genetic parameters and estimated breeding values (EBVs); and

marker assisted selection, which all paved the way to DA-PCC becoming the only livestock agency in the DA that has a well-organized and -structured breeding program demonstrated with locally produced riverine buffalo and swamp buffalo bulls with EBVs.

These initiatives, coupled with genomic selection using high density single nucleotide polymorphism (SNP) genotyping, provide the latest generation of performance and progeny-tested Philippine dairy buffalo bulls with pedigree-based and genomic breeding values.

Dr. Flores' team has also extended their research to cattle and pigs with the development of genetic testing protocol for genes associated with fertility, growth rate, meat yield and quality in commercial swine and cattle breeds.

Dr. Ocampo, on the other hand, is a technical expert in animal reproductive biotechnology and physiology and works on the development of practical cryopreservation methods suitable for native farm animals and other ruminant species endemic in the Philippines.

Her research contributes significantly in ensuring frozen semen from indigenous



Dr. Edwin Atabay
Scientist II



Dr. Claro N. Mingala
Scientist IV



Dr. Marvin Villanueva
2021 Outstanding Young Scientist
(Veterinary Medicine)

farm/food animals as well as endangered wildlife ruminants, which will be added to the core collections of the National Animal Genetic Resources Cryobank Repository.

Dubbed as "Sperm Rescue 911", she was able to recover live sperm from the epididymis of post mortem testes of slaughtered bucks which were later proven to be physiologically fertile with subsequent embryonic development after utilization thru IVF and embryo culture.

Newly upgraded Scientist IV Dr. Mingala spearheaded the optimization, development and application of molecular-based protocols for the detection of various livestock diseases that have economic and public health importance in the country. These protocols included loop-mediated isothermal amplification (LAMP), polymerase chain reaction (PCR), nested-PCR, as well as combination of nanotechnology (using Nano-gold) in which two of these are now on the pipeline for intellectual property (IP) applications.

He also works with various international and national scientific agencies on Leptospirosis and Tuberculosis surveillance and detection in the Philippines and vaccine development for schistosomiasis while continuously exerting efforts to address pressing concerns in the livestock industry.

Moreover, he completed the Private-Public Partnership Research on Enhancing Milk Production of Water Buffaloes through S&T Interventions

as the leader of the Development of health care technologies and practical farm practices project 3 in support of increasing buffalo milk production under the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD) grant.

Dr. Mingala is concurrently the center chief of the DA-Livestock Biotechnology Center.

Meanwhile, Dr. Edwin is an expert in animal physiology and reproduction and actively engaged in S&T projects and activities directed towards improving fertility of water buffaloes and other ruminant species.

He spearheaded the implementation of Intensified Reproductive Management Program that promotes the use of modern reproductive biotechnologies such as Fixed Time Artificial Insemination, Ultrasonography, and early pregnancy detection to improve the overall reproductive efficiencies in livestock.

Moreover, he leads the conduct of embryo transfer activities for dairy production, which later successfully produced the first calf, named "Pag-asa", from this technology.

Another reproductive biotechnology and physiology expert is Dr. Eufrocina, whose works are focused on enhancing fertility and reproductive performance of livestock through embryo in-vitro techniques, Multiple Ovulation and Embryo Transfer (MOET),

cryopreservation of embryos and oocytes, and Fixed Time Embryo Transfer.

Likewise, she spearheaded the team on the use of sex-sorted semen for FTAI which resulted in the birth of first female calf from sexed-semen, named "Liwanaag". Currently, Dr. Eufrocina is involved in the project on semen sexing to boost the local dairy production.

She has also been involved in the development of Intensified Reproductive Management Program dubbed as the Triple E strategy for water buffaloes and other livestock and also established an IP-Technology Commercialization Office and a system which facilitates effective translation of research into products and services for the benefit of the clients, general public and livestock industry.

Outstanding Young Scientist Dr. Villanueva, a graduate of Doctor of Philosophy in Veterinary Medicine at Hokkaido University in Sapporo, Japan, is the officer-in-charge of the DA-PCC's Research and Development Division.

His research undertakings include (1) food safety especially on antimicrobial resistance and drug residues, (2) livestock biotechnologies (animal health and diagnostics), (3) epidemiology, detection and control of bacterial zoonotic diseases, and (4) addressing operational health problems in ruminant farming. He authored numerous ISI/ Scopus indexed journal articles, electronic book and book chapter with focus on his fields of interests.



Dr. Ester Flores
Scientist I



Dr. Lerma Ocampo
Scientist I



Dr. Eufrocina Atabay
Scientist II

OPINION



Smart and Practical R4D solutions

MARVIN A. VILLANUEVA, PhD
PCC-OIC National R4D Coordinator

Again, this year proved that PCC researchers can withstand challenges brought by the COVID-19 pandemic. Amid the travel restrictions and fear of getting infected, we managed to accomplish the Division's targeted activities for the year, be it in the conduct of actual research or in support to operations. Our resourcefulness and innovation stands out in all of us to fulfill our duties. We were able to successfully conduct our major activities such as PCC-RDD In-House Review of on-going and completed projects, S&T Seminars, Intellectual Property-related activities and more.

We are proud of our Division's significant contributions to the livestock industry and serving the communities. We witnessed the growing interests of our stakeholders with some of our outstanding technologies such as MilkyBun that is embraced by our partner cooperatives, private bakeries that are now enjoying financial benefits. Even the vending machine that was introduced by our agency spurred interests by our partner clients. It made us realize that those technologies that we are developing can be simple but practical enough in directly addressing the problem.

We also proved that through our PCC core values (EPICS), our PCC scientists/researchers received prestigious awards from the National Academy of Science and Technology and Civil Service Commission this year. They are an inspiration and a role model for young researchers to develop meaningful technologies that would benefit our

partner clients and the livestock industry.

Other milestones that PCC-RDD takes pride is the inauguration of the PCC National Livestock Cryobank for the purpose of repository of genetic materials of livestock in the country for future use. PCC through RDD also entered into several research collaborations between local and international institutions for the accomplishment of common research goals and capacity building (personnel and resources).

One of the major challenges that RDD will probably face (PCC as a whole) is the implementation of the Mandanas-Garcia Court Ruling, where some of the usual functions of the national agencies will be transferred to LGU. Also, technical support must be directed to the LGU instead of extending it to the clients directly. This is crucial since farmer clients are used to receive technical assistance directly from PCC. PCC just needs to ensure that quality services will definitely reach to those who are in need.

To our fellow researchers, let us clear our minds that what we are doing are "Research for Development", and we must always be mindful of the urgent problems that need to be addressed. Let us gather all our talents, resources and ideas to come up with even simple yet practical solutions in directly solving the problems in the carabao industry. With us entering into the Digital Age, let us utilize those advanced technologies in making our work effective, efficient and easy to use. After all, our barometer of being successful is by uplifting the lives of the rural farming communities.

R4D Highlights[®]

R4D Highlights, an annual publication of the Philippine Carabao Center, publishes in popularized form the agency's researches presented in its annual R&D Review. This publication reaches out to a wide scope of readers both in the science and non-science professions as well as the general public.

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